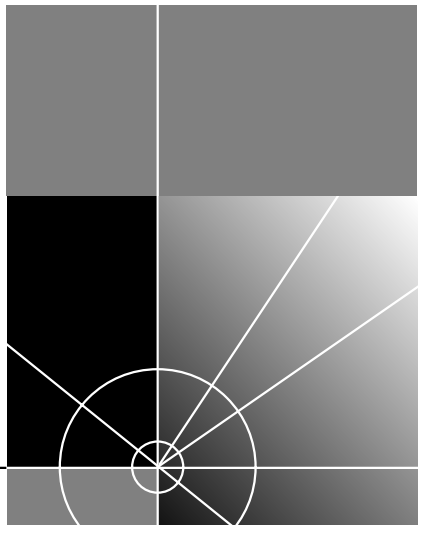
SuperStack® II Hub 1000 SX User Guide

A member of the 3Com SuperStack II System



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3Com Corporation
5400 Bayfront Plaza
Santa Clara, California
95052-8145

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About This Guide

This guide contains installation procedures and technical information about the 3Com® SuperStack® II Hub 1000 SX Gigabit Ethernet full-duplex repeater (part number 3C510-SX).

It is assumed that the user knows basic precautions and procedures for working with electrical equipment and has experience installing, using, and managing an Ethernet network. It is also assumed that the user has some knowledge of repeater technology.

If release notes are shipped with this product and the information in the release notes differs from the information in this guide, follow the information in the release notes.

Table 1 and Table 2 list conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Notice Type	Description
	Information note	Important features or instructions
	Caution	Information to alert you to potential damage to a program, system, or device
	Warning	Information to alert you to potential personal injury

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Table 2 Text Conventions

Convention	Description
`Screen displays`	This typeface represents information as it appears on the screen.
`Commands`	The word "command" means you must enter the command exactly as shown in text and press Return or Enter. For example: To remove the IP address, enter the following command: **`SETDEFAULT !0 -IP NETaddr = 0.0.0.0`** This guide always gives the full form of a command in uppercase and lowercase letters. However, you can abbreviate commands by entering only the uppercase letters and the appropriate value. Commands are not case sensitive.
The words "enter" and "type"	When you see the word "enter" in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
Keyboard key names	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). For example: Press Ctrl+Alt+Del.
Menu commands and *buttons*	Menu commands or button names appear in italics. Example: From the *Help* menu, select *Contents*.
Words in *italicized* type	Italics emphasize a point or denote new terms at the place where they are defined in the text.
Words in **bold-face** type	Bold text denotes key features.

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1 INTRODUCTION

Gigabit Ethernet technology allows signal transmission at the rate of one gigabit per second (1 Gbps, or 1000 Mbps), while continuing to support IEEE 802.3 CSMA/CD local area networks. Using this technology, you can add gigabit bandwidth to critical areas of a network and fully leverage investments in Ethernet and Fast Ethernet products.

Hub 1000 SX General Description

The 3Com® SuperStack® II Hub 1000 SX Gigabit Ethernet full-duplex repeater (part number 3C510-SX) combines the low cost and simplicity of a hub with the high performance and efficient throughput of a switch. You can use the Hub 1000 SX to:

- Aggregate servers
- Aggregate 10/100 Mbps switches
- Provide gigabit bandwidth to a power workgroup that is running a high-bandwidth application such as medical imaging, video editing, film postproduction, CAD/CAM, or digital prepress

The Hub 1000 SX is an eight-port repeater. All ports transmit and receive at a speed of one gigabit per second. The hub forwards all incoming packets (without filtering them) to all links except the originating link, thus providing a shared bandwidth domain. Like a switch, the Hub 1000 SX uses full-duplex ports and packet flow control to increase bandwidth and ensure reliable performance.

The hub is ready to use and requires no configuration. However, some configuration options are available through the console interface for use in exceptional cases.

The Hub 1000 SX is part of the 3Com SuperStack II system and can be used with the SuperStack II Advanced Redundant Power System (Advanced RPS) and the SuperStack II Uninterruptible Power System (UPS), which provide fail-safe operation and a constant power supply.

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Downlinks and Uplink

The hub's eight 1000BASE-SX full-duplex downlink ports (downlinks) can connect to servers or clients that are equipped with Gigabit Ethernet network interface cards (NICs) or to 10/100 Mbps switches that are equipped with Gigabit Ethernet uplink devices.

One uplink port (uplink) accepts an optional gigabit interface connector (GBIC) module. The following types of GBIC modules are available:

- 1000BASE-CX coaxial transmits over short-haul shielded balanced copper cable (known as twinaxial STP).
- 1000BASE-LX long-wavelength transmits over multimode fiber (MMF) or single-mode fiber (SMF) cable.
- 1000BASE-SX short-wavelength transmits over MMF cable.

The primary use of the uplink is to connect to a network backbone through a Gigabit Ethernet switch such as the 3Com SuperStack II Switch 9300.

Full-Duplex Operation

Full-duplex operation allows frames to be transmitted and received simultaneously and, in effect, doubles the bandwidth available on a link. For Gigabit Ethernet devices, full-duplex operation allows a peak data transmission rate of 2 Gbps. All Hub 1000 SX ports operate only in full-duplex mode and receive frames from attached segments at a speed of 1 Gbps.

Each port's input buffer places received packets in an 18 KB input FIFO to wait in a queue for the hub's internal bus. The hub grants ports access to the bus in a round-robin fashion. When a port has access to the bus, it places the packet at the head of its input queue on the bus. All the other ports transmit the packet out. Link-level flow control manages the queue.

Flow Control

The Hub 1000 SX uses IEEE 802.3x flow control to prevent input buffers from overflowing. Flow control uses *pause frames* to communicate buffer status between linked transmitting and receiving devices (transmitters and receivers). A receiver sends a pause frame—thereby using *outgoing* flow control—to tell a transmitter to stop the transmission of data frames for a specified period, allowing the receiver's input port buffers to empty. When a transmitter receives pause frames—using *incoming* flow control—it suspends transmission for the specified period.

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When the receiver's input buffers can store packets again, it can either send another pause frame to tell the transmitter to resume transmission, or wait for transmission to resume.

If the Hub 100 SX receives a pause frame, it does not remove the frame from the network. Instead, it corrupts the frame's CRC field and retransmits the frame to all other ports.

Asymmetric Flow Control

With asymmetric flow control, only one of two linked devices can use incoming flow control to receive pause frames. Most full-duplex repeaters default to asymmetric flow control. The Hub 1000 SX downlinks support asymmetric, outgoing flow control only. The downlinks can send pause frames to tell attached devices to stop transmission. They ignore any pause frames that they receive, because acting upon them would stop transmission to all ports, bringing hub operation to a halt.

Symmetric Flow Control

With symmetric flow control, both linked devices can use incoming and outgoing flow control to send and receive pause frames. The Hub 1000 SX uplink defaults to symmetric flow control—also known as *bidirectional* flow control—which prevents congestion at the core of the network when the hub is connected to the network backbone.

The uplink can be reconfigured for asymmetric, outgoing flow control to support a connection to a server or 10/100 Mbps switch.

Auto-Negotiation

Related to flow control is the auto-negotiation capability, in which the Hub 1000 SX ports and linked devices advertise their flow control capabilities and automatically select the best common mode of communication. During an auto-negotiation sequence, the Hub 1000 SX downlinks advertise their capability for *outgoing* flow control and the uplink advertises its capability for *incoming* and *outgoing* flow control. For example, the result of an auto-negotiation sequence between a Hub 1000 SX downlink and a SuperStack II Switch 3000 port is that the downlink uses outgoing flow control and the switch port uses incoming flow control.

Forced Link

The Hub 1000 SX ports default to auto-negotiation. Rare cases (for example, linking to a device that does not support auto-negotiation) may require that auto-negotiation be disabled on a port, thereby enabling *forced link* on that port. When forced link is enabled, linked devices must have matching flow control capabilities. For example, a port that is set for forced link and outgoing flow control can connect successfully only with a port that is set for forced link and incoming flow control.

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Features and Functions

The hub can be mounted in a 19-inch standard rack or placed on a flat surface. It supports the 1000 Mbps media access control (MAC) as specified in the IEEE 802.3z standard. In addition, the hub has these features:

- LED indicators report the status of each port and of hub operations. A meter shows the percentage of bandwidth being used within the hub.
- The serial console interface allows limited options for port configuration and, if necessary, firmware updates.
- Power-on self-test (POST) diagnostics determine whether the hub is functioning properly at power up.
- Frame-aging firmware improves performance by minimizing unnecessary frame aging and subsequent attempts to retransmit packets at the protocol level.
- Round-robin arbitration grants fair access for all ports to the hub's internal bus on a packet-by-packet basis.
- Signal retiming restores the timing and amplitude of the received signal before retransmitting the signal.
- A carrier integrity monitor checks packets for invalid framing and removes invalid frames from the network.
- Jabber control inhibits overly long transmissions of data generated by the hardware failure of an attached device.

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2 INSTALLING THE HUB

This chapter describes the Hub 1000 SX package contents and provides installation procedures for the hub and for optional GBIC modules and power systems.

No configuration is required to install and use the hub.

Safety Precautions

To avoid personal injury or damage to the Hub 1000 SX unit, observe the following safety precautions:

***WARNING**: Do* not *perform any maintenance on the hub while it is still connected to a power source.*

***WARNING**: Remove all jewelry from your hands and wrists before installing the hub. Use insulated or nonconductive tools.*

***CAUTION**: Power for the unit must be supplied by a grounded power source. The hub should never be connected to an ungrounded AC outlet or power supply.*

Package Contents

Remove the hub from the shipping package and verify that you have received these items in good condition:

- Hub 1000 SX unit
- Rack mounting kit containing two brackets and four screws
- Four rubber feet for desktop placement
- AC power cord
- *SuperStack II Hub 1000 SX User Guide*

Inspect each item for damage. If you find a problem, contact the network supplier and the carrier that delivered the package.

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If you need to return the hub to 3Com, pack it in the original (or equivalent) packing material to maintain the warranty.

If you ordered a GBIC module or optional power system, it is packaged separately from the hub.

Hub Description

The hub's front and rear panels are shown in Figure 2-1.

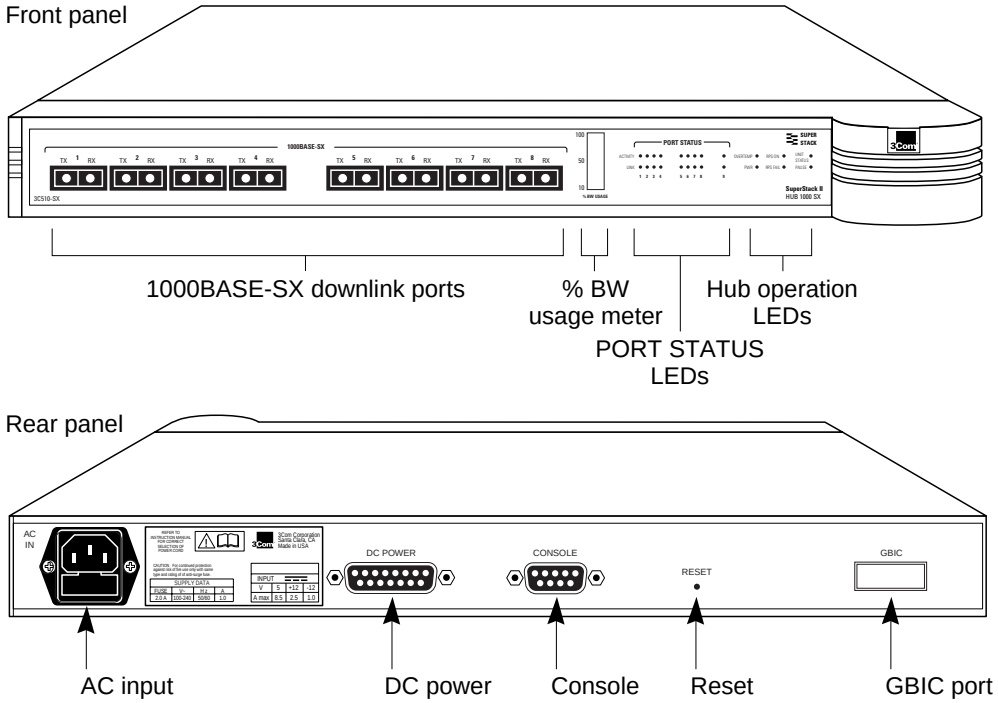

Figure 2-1 Hub 1000 SX Front and Rear Panels

Front Panel

Eight 850-nanometer (nm) fiber-optic 1000BASE-SX Gigabit Ethernet downlink ports accept SC connectors and support 50/125 µ or 62.5/125 µ fiber-optic cable. The ports can connect to servers that are equipped with Gigabit Ethernet NICs or to switches that are equipped with Gigabit Ethernet uplink devices.

Indicators (see Table 2-2) show hub and port status when power is on.

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Rear Panel

The AC input socket accepts a 100–240 V AC power cord. Power can be supplied through optional 3Com SuperStack II Advanced Redundant Power System (Advanced RPS) and SuperStack II Uninterruptible Power System (UPS) units. These units use the DC power connector. See "Using Optional Power Systems" later in this chapter.

The console port, a DB-9 standard male connector, can connect to a PC through a null modem cable. For information on the console functions, see Appendix A.

The Reset button resets the hub's on-board CPU.

The GBIC port accepts an optional 3Com GBIC module that lets the hub connect to a Gigabit Ethernet device.

Preparing the Site

Make sure that the installation site meets the following conditions:

- The hub is accessible and you can easily connect the cables.
- The cables are away from:
  - Sources of electrical noise, such as: heating, ventilation, and air conditioning (HVAC); radios; transmitters; and broadband amplifiers
  - Power lines and fluorescent lighting fixtures
- Water or moisture cannot enter the hub's case.
- Airflow around the unit and through the vents is not restricted. Provide a minimum of 1-inch (2.5-cm) clearance on all four sides of the unit.
- No objects are placed directly on top of the unit.

Installing and Connecting the Hub

You can mount the hub in a standard 19-inch rack or place it on a desk or table.

Mounting in a Rack

Two brackets and four screws allow rack mounting in a standard 19-inch rack.

1. Place the hub on a level surface, with the front panel facing you.
2. Position a bracket over the mounting holes on one side of the hub, as shown in Figure 2-2.

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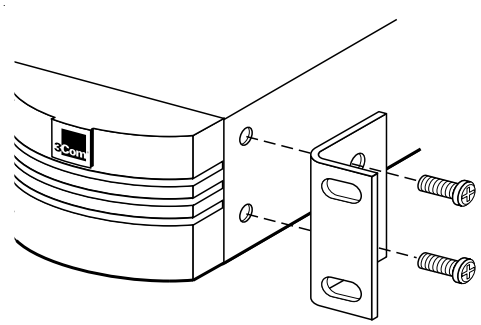

Figure 2-2 Attaching a Bracket for Rack Mounting

3 Insert the two screws and tighten with a screwdriver. Do not overtighten the screws.

4 Repeat steps 2 and 3 for the other side of the hub.

5 Mount the hub in the rack and secure it with suitable screws, as shown in Figure 2-3.

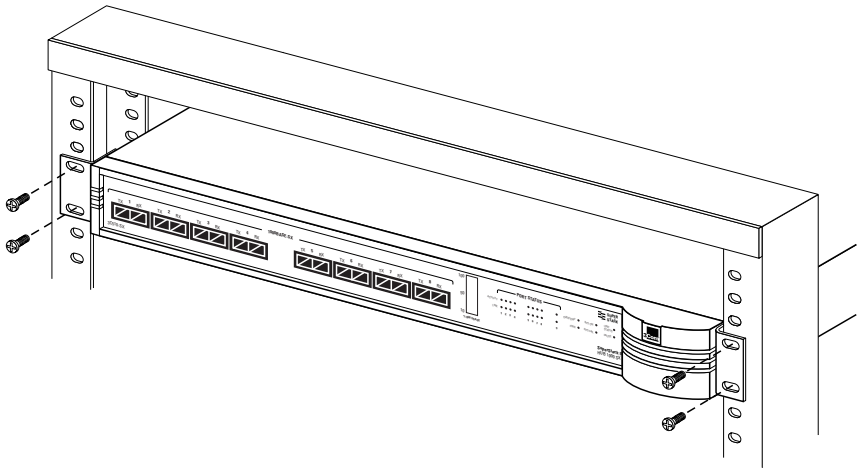

Figure 2-3 Rack Mounting the Hub

6 Remove the protective rubber cap from each downlink port and attach the proper cable to make the desired network connection. Table 2-1 provides connector and cable information for downlink connections. For guidelines on making typical connections, see Chapter 3.

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Table 2-1 Downlink Connections

Connector Type	Cable Type	Maximum Cable Length (Meters)
SC	Short-wavelength (850 nm) fiber-optic:	
	62.5/125 µ MMF	260
	50/125 µ MMF	550

7 Apply power to the hub in either of these ways:

- Plug one end of the power cord into the AC input socket and the other end into a power source.
- Connect the hub to a power supply, as described in "Using Optional Power Systems" later in this chapter.

Placing on a Desktop

If you place the hub on a desk or table, attach the supplied rubber feet to each bottom corner of the hub. Remove the protective cap from each downlink port and attach the proper cable to make the desired network connection. (For connector and cable information, see Table 2-1. For guidelines on making typical connections, see Chapter 3.) Apply power to the hub in either of these ways:

- Plug one end of the power cord into the AC input socket and the other end into a power source.
- Connect the hub to a power supply, as described in "Using Optional Power Systems" later in this chapter.

Interpreting Hub Indicators

When power is applied, all the indicators on the front panel light momentarily. The UNIT STATUS LED is amber while POST is running. After approximately 30 seconds, the UNIT STATUS LED turns green. Verify that the PWR (power) LED remains lit, indicating that the hub is receiving power.

For explanations of the hub indicators, see Table 2-2.

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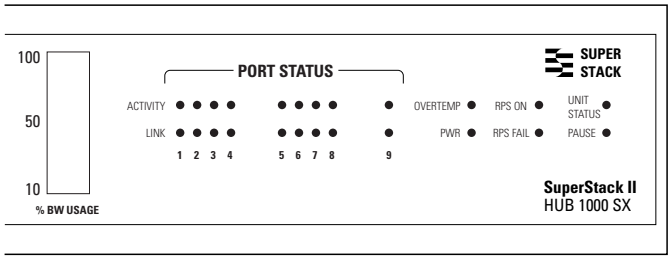
Table 2-2 Hub 1000 SX Indicators



Indicator	Color	Status	Meaning
% BW usage meter	Green	Fluctuating	The meter indicates the percentage of bandwidth that the hub is using. Because the hub can be connected to multiple network segments, this meter represents the aggregate load on the hub.
PORT STATUS LEDs			LEDs 1 through 8 show the status of the downlinks. LED 9 shows the status of the uplink.
ACTIVITY	Green	ON	The port is receiving data.
		OFF	The port is not receiving data.
LINK	Green	ON	A connection exists between the port and the end node.
		OFF	There is no connection between the port and the end node.
Hub operation LEDs			
OVERTEMP	Amber	ON	The internal temperature exceeds 158 °F (70 °C).
RPS ON	Green	ON	The Advanced RPS is connected and turned on.
UNIT STATUS	Amber	ON	The hub is performing POST diagnostics. If the amber LED remains lit for longer than 30 seconds, POST has failed or the CPU has halted.
		Flashing	An error has occurred.
	Green	ON	The hub is operating normally.
		Flashing	A firmware update is proceeding.
	Amber/Green	Flashing	A firmware update error occurred. See "Troubleshooting" in Appendix A.
PWR	Green	ON	The hub is receiving power.
RPS FAIL	Amber	ON	The Advanced RPS is connected, but a failure condition exists.
PAUSE	Green	ON	The uplink port has received a pause frame. For an explanation of pause frames, see "Flow Control" in Chapter 1.

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Installing and Connecting a GBIC Module

The gigabit interface connector (GBIC) port on the rear panel of the Hub 1000 SX chassis accepts an optional 3Com GBIC module that permits connection to a Gigabit Ethernet device. GBIC modules must be ordered separately in either single-packs or six-packs.

By inserting the appropriate GBIC module in the hub's rear-panel uplink port, you can use various types of cabling to connect the hub to LAN devices. For example, you can use the 1000BASE-LX module to reach much greater distances than is possible with 1000BASE-SX connections.

A sample GBIC module appears in Figure 2-4. Table 2-3 lists the types of GBIC modules available from 3Com.

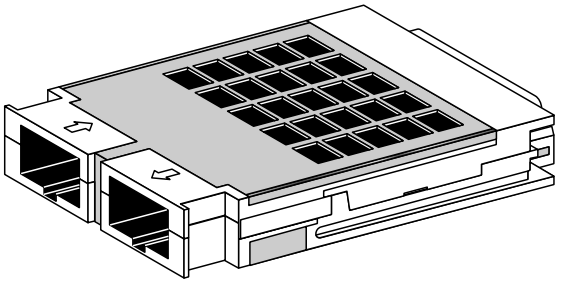

Figure 2-4 Sample GBIC Module

Table 2-3 GBIC Modules

Module Type	3Com Part Number	Connector Type	Cable Type	Maximum Cable Length (Meters)
1000BASE-CX	3CGBIC4 3CGBIC4-6PK	HSSDC	Shielded balanced twinaxial STP (coaxial jumper)	25
1000BASE-LX	3CGBIC2 3CGBIC2-6PK	SC	Long-wavelength fiber-optic (1300 nm): 62.5/125 µ MMF 50/125 µ MMF SMF	 440 550 3000
1000BASE-SX	3CGBIC1 3CGBIC1-6PK	SC	Short-wavelength fiber-optic (850 nm): 62.5/125 µ MMF 50/125 µ MMF	 260 550

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To install and connect a GBIC module, follow these steps:

1. Disconnect all power to the Hub 1000 SX.

   Disconnect the AC power cord. If you are using an Advanced RPS unit, disconnect the RPS cable from the DC power connector.

2. Remove the GBIC module from its shipping container.

3. Slowly insert the module into the rear-panel uplink port, being careful not to damage any of the components or connecting pins.

   The module slides into the hub following the tracks in the slot. The lettering that shows the module type must be positioned on top of the connector openings when the module is in place.

4. Push the module all the way in until the connector makes contact.

5. Reattach the power cord and any power system cable to the hub.

6. Attach the proper cable to the module to make the desired network connection.

   Both ends of the connection must be of the same media type (CX, LX, or SX).

7. Reconnect power to the hub.

Using Optional Power Systems

You can ensure fail-safe operation and constant power to SuperStack II components by using the SuperStack II Advanced Redundant Power System (Advanced RPS) and the SuperStack II Uninterruptible Power System (UPS). These units and associated Power Modules and cabling must be purchased separately.

Advanced RPS

A single SuperStack II Advanced RPS (part numbers 3C16070 and 3C16071) can protect up to four SuperStack II Hub 1000 SX units from internal power supply failures. If a SuperStack II unit's internal power fails, the Advanced RPS is capable of supplying all the unit's power needs.

The Advanced RPS chassis is rack-mountable. It is fed by two independent AC lines and remains operational if one of the AC lines fails. The front panel provides LED indicators for monitoring temperature as well as power input and output status.

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Power Modules

At least one SuperStack II Advanced Redundant Power System Power Module Type 2 is required for each SuperStack II hub that you want to protect. The Hub 1000 SX requires the 100-watt, 3.3-volt version of the module (part number 3C16074).

One Advanced RPS with Power Modules configured with straight cables for standard usage can contain a maximum of four 100-watt Power Modules (and four 60-watt Power Modules), or eight 60-watt Power Modules. If each Power Module is configured for full redundancy with a SuperStack II Advanced Redundant Power System Y Cable Type 2 (part number 3C16079), an Advanced RPS can contain a maximum of eight 100-watt Power Modules, supporting as many as four Hub 1000 SX units.

Using the cable supplied with the Power Module, you connect the Power Module to the DC power connector located on the rear panel of the Hub 1000 SX. (For the DC power connector location, see Figure 2-1.)

In the event of a failure in a Power Module, an alert is automatically sent to the Advanced RPS management console software.

Cabling Options

You can supply AC power and DC power to the Hub 1000 SX simultaneously, so that if an AC power failure occurs, the hub switches to DC power supplied by the Advanced RPS unit. You can also supply only DC power to the hub with the Advanced RPS unit.

Table 2-4 summarizes the Advanced RPS configuration options.

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Table 2-4 Advanced RPS Configuration Options

Option	Connection	Description
Standard usage	Disconnect the hub's AC power cable from the AC outlet. Use the straight DC cable supplied with the Power Module to connect the Power Module directly to the hub through the DC power connector located on the hub's rear panel. (See "Rear Panel" in this chapter.)	The hub obtains DC power from a single Power Module instead of being powered directly from a standard AC source. If the Power Module fails, you can swap the faulty module for a new one. This swapping method requires a reset of the hub, as in a power cycle. A cold Power Module supplies power after about 5 seconds.
Managed redundancy	Connect the hub's AC power cable to a standard AC outlet. Use the straight DC cable supplied with the Power Module to connect the Power Module directly to the hub through the DC power connector located on the hub's rear panel. (See "Rear Panel" in this chapter.)	If the Hub 1000 SX internal power supply fails, the hub's auto-enable feature automatically enables the Advanced RPS and resets the hub, as in a power cycle.
Full redundancy	Disconnect the hub's AC power cable from the AC outlet. Use a Y DC cable (part number 3C16079) to connect the hub directly to two Power Modules through the DC power connector located on the hub's rear panel. (See "Rear Panel" in this chapter.)	This configuration offers *full resilience* for mission-critical installations. The hub is powered from both Power Modules instead of being powered directly from a standard AC source. If one of the Power Modules fails, the other module takes the full load. The faulty module can be hot-swapped, returning the system to full redundancy without the need for a power reset.

When switching from Advanced RPS (DC) to AC power or from AC power to Advanced RPS power, the Hub 1000 SX unit resets itself. For example, if both the RPS and AC cables are plugged in, and then either is removed, the unit resets itself when it changes to the other power source.

Uninterruptible Power System

The SuperStack II Uninterruptible Power System (UPS) (part number 3C16010, U.S. version) protects against building power outages, brownouts, power surges, and spikes. If primary power fails or falters for any reason, the UPS automatically provides power for as long as 7 minutes for up to four SuperStack II system units with 100-volt 50/60 Hz, 120-volt 60 Hz, or 230-volt 50/60 Hz power.

A hub connects to a UPS unit through the hub's AC power cord.

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You can connect a UPS unit to an Advanced RPS unit as long as you do not exceed the maximum wattage (325 watts) for the UPS unit. To verify that the UPS unit's maximum wattage is not exceeded, calculate the total power consumption of all units connected to the Advanced RPS. If the result is less than 325 watts, your configuration is safe; if the result is greater than 325 watts, then there are too many units connected to the Advanced RPS.

To calculate the total power consumption of all units connected to the Advanced RPS:

1 Calculate the total wattage of all the units connected to the Advanced RPS.

For example, one Hub 1000 SX has a maximum power consumption of 65 watts; two Hub 1000 SX units have a maximum power consumption of 130 watts, and so forth.

2 Divide the total wattage of all units by 0.7, which is the efficiency rating (70%) of the Advanced RPS.

If the result is less than 325 watts, your configuration is safe; if the result is higher, then there are too many units connected to the Advanced RPS.

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3 MAKING CONNECTIONS

This chapter contains guidelines for making typical Hub 1000 SX network connections and for troubleshooting problems with the hub.

When making hub connections, follow the rules for maximum cable lengths, which are summarized in Table 3-1. If you connect 10/100 Mbps devices to the network, rules for Ethernet and Fast Ethernet connections also apply.

Table 3-1 Gigabit Ethernet Maximum Cable Lengths

			Cable Type			
Signal Type	**Laser Wavelength**	**Connector Type**	**50/125 µ Multimode Fiber**	**62.5/125 µ Multimode Fiber**	**Single-Mode Fiber**	**Shielded Balanced Pair (Coaxial Jumper)**
1000BASE-SX	Short (850 nm)	SC	550 meters	260 meters	N/A	N/A
1000BASE-LX*	Long (1300 nm)	SC	550 meters	440 meters	3 kilometers	N/A
1000BASE-CX	N/A	HSSDC	N/A	N/A	N/A	25 meters

* The 1000BASE-LX GBIC module requires an external patch cord for connection to MMF cable.

CAUTION: *Connecting the downlink of one Hub 1000 SX to the uplink of a second Hub 1000 SX degrades the performance of the second hub.*

CAUTION: *Connecting a Gigabit Ethernet switch downlink to a Hub 1000 SX downlink degrades the performance on the link to the switch.*

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Aggregating Servers

You can use the Hub 1000 SX downlinks to aggregate servers into *server farms*. First, install 3Com 3C985-SX Gigabit EtherLink® Server NICs in each server. Then, connect up to eight servers through the downlinks. The hub's optional gigabit interface connector (GBIC) uplink can connect to a 3Com SuperStack II Switch 9300 Gigabit Ethernet switch, thereby connecting to the network backbone. See Figure 3-1.

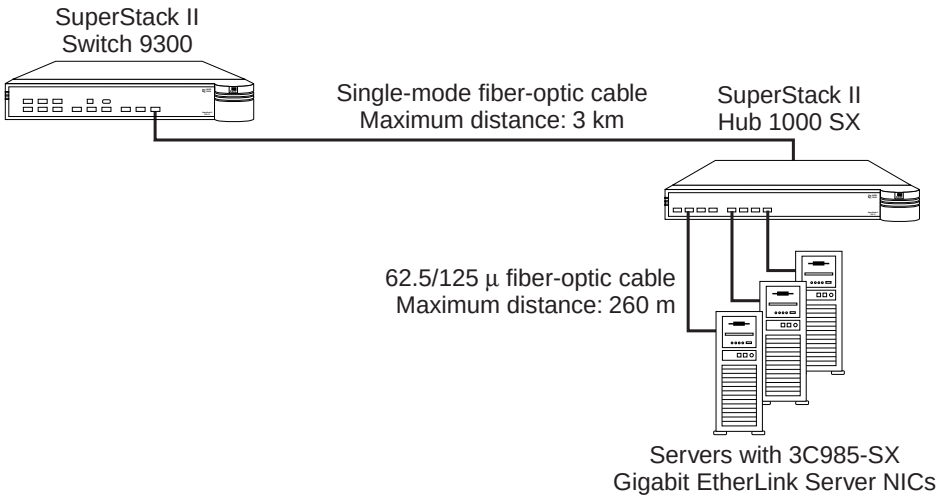

Figure 3-1 Server Farm Connection

Connecting a Power Workgroup

A power workgroup consists of a small number of servers, or a small number of sophisticated users on high-end workstations. Such a workgroup requires very high performance to run applications that move and process massive amounts of data in real time (for example, medical imaging, video editing, film postproduction, CAD/CAM, or digital prepress).

You can provide gigabit bandwidth to a power workgroup as shown in Figure 3-2.

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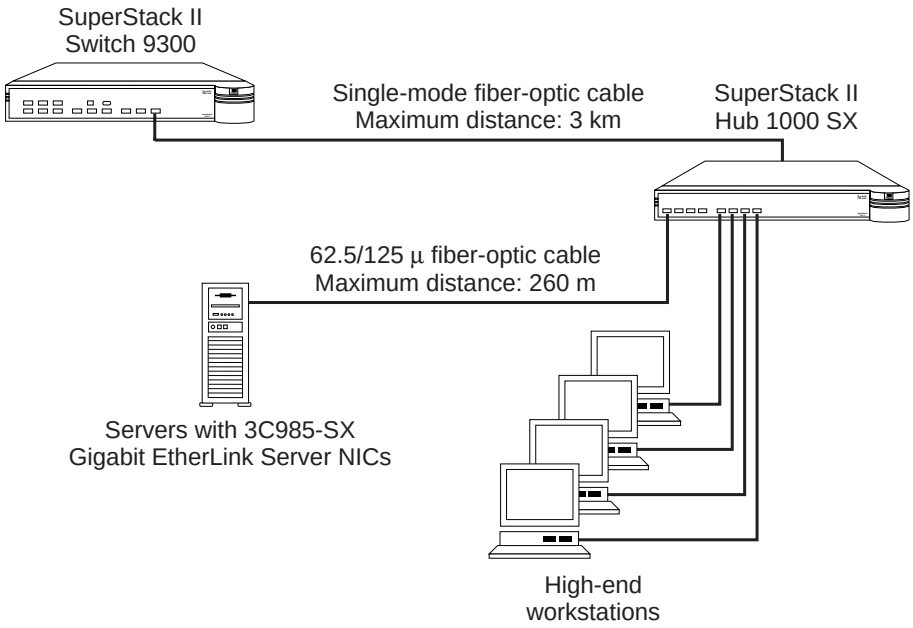

Figure 3-2 Power Workgroup Connection

Aggregating Switches

You can use the Hub 1000 SX downlinks to aggregate 10/100 Mbps switches such as the 3Com SuperStack II Switch 1000, Switch 3000, or Switch 3900. The Switch 1000 and Switch 3000 units must be equipped with Gigabit Ethernet uplink devices (SuperStack II Switch Gigabit Ethernet SX Module, part number 3C16925). The Switch 3900 has one built-in Gigabit Ethernet port, which can be used to connect with the Hub 1000 SX.

First, install 3C16925 uplink devices in the SuperStack II Switch 1000 or SuperStack II Switch 3000 switches. Then connect up to eight switches to the Hub 1000 SX through the eight downlinks. The hub's optional GBIC uplink can connect to a 3Com SuperStack II Switch 9300 Gigabit Ethernet switch, thereby connecting to the network backbone. See Figure 3-3.

The Hub 1000 SX does not support bandwidth aggregation (trunking).

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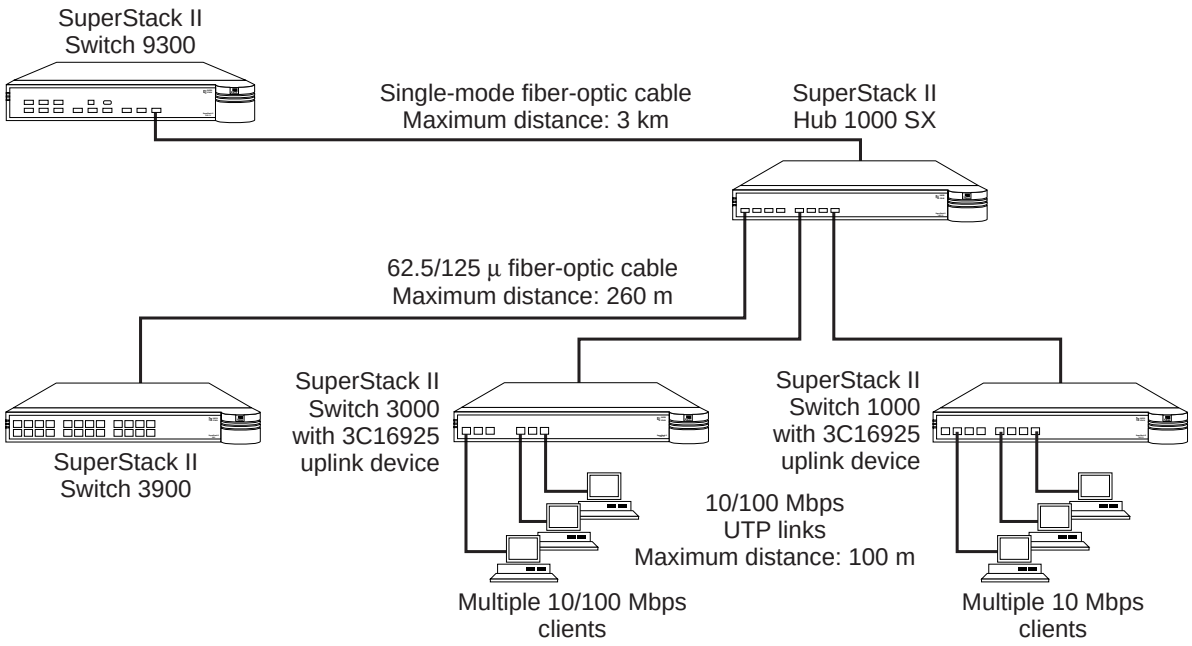

Figure 3-3 Aggregated Switches Connection

Mixing Connections

You can vary connections according to your requirements. For example, you can connect a number of servers and 10/100 Mbps switches through the downlinks, and connect to the network backbone through the uplink, as shown in Figure 3-4.

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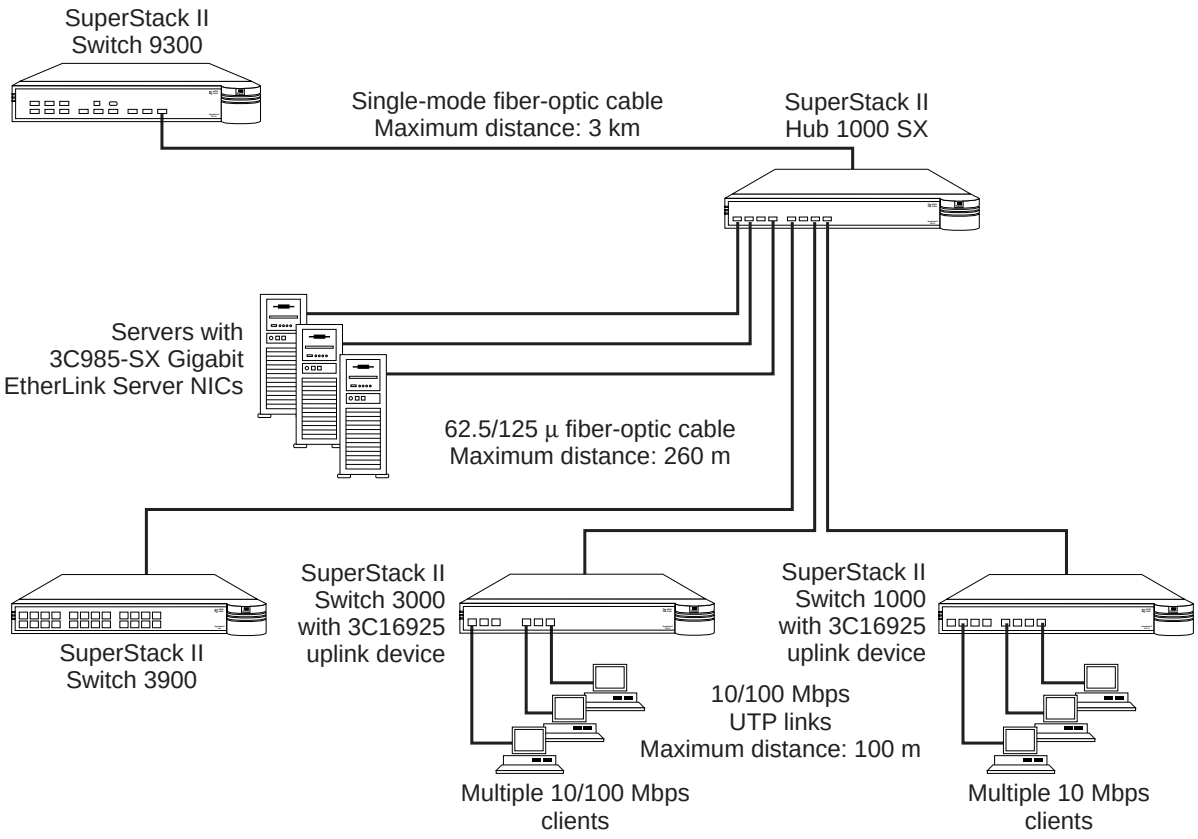

Figure 3-4 Mixed Connection

Connecting Through the Uplink

The best use of the hub uplink is as a backbone connection to a 3Com SuperStack II Switch 9300 Gigabit Ethernet switch, as shown earlier in Figure 3-1 through Figure 3-2. Although two Hub 1000 SX units can be connected to each other through their uplinks, as shown in Figure 3-5, such a connection excludes connection to the network backbone.

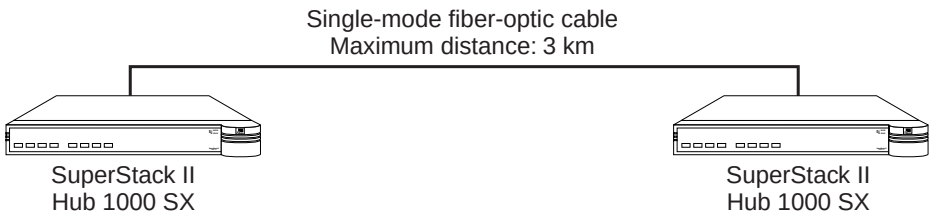

Figure 3-5 Connection to Another Hub 1000 SX

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The Hub 1000 SX itself can be used as the network backbone by connecting the uplink to a server equipped with a 3C985-SX Gigabit EtherLink Server NIC or to a 10/100 Mbps switch equipped with a 3C16925 uplink device (see Figure 3-6). For these backbone connections, reconfigure the uplink for asymmetric flow control, as described in "Configuring Port Settings" in Appendix A.

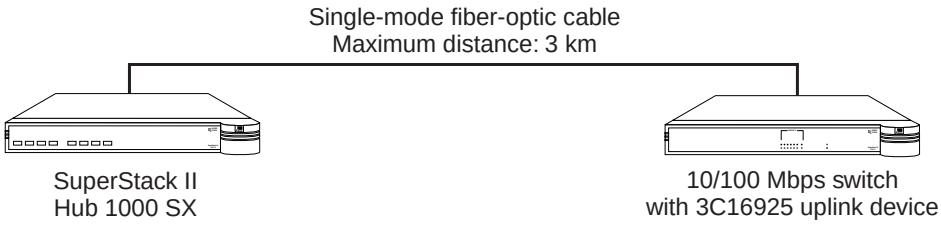

Figure 3-6 Uplink Connection to a 10/100 Mbps Switch

Troubleshooting

Table 3-2 summarizes some common problems and their solutions.

Table 3-2 Troubleshooting Tips

Symptom	Explanation	Solution
LINK LED does not light on a port.	There is no link connection.	You may be attempting to connect to equipment that does not comply with Gigabit Ethernet standards or does not support auto-negotiation. Or, the link may be physically damaged (for example, the cable may be damaged).
		Disable auto-negotiation on the port (see Appendix A). Configure the other end of the link for forced configuration (see the configuration guidelines for the device on the other end of the link). A restored connection rules out physical damage.
ACTIVITY LED does not light on a port.	The port is not receiving data.	Make sure that the link is connected at both ends.
OVERTEMP LED is lit.	The unit has overheated. The fan may have failed.	Return the unit to the supplier.
Amber UNIT STATUS LED stays lit longer than 30 seconds.	POST software may be corrupted.	Use the command line interface (CLI) to confirm the POST error. (See Appendix A.) If POST reports errors, return the unit to the supplier.
PAUSE LED remains lit.	A flickering PAUSE LED indicates normal flow control. A PAUSE LED that remains lit indicates that there is too much traffic.	Check for problems with the device attached to the Hub 1000 SX uplink.
POST FAIL messages appear in the CLI.	There is a fatal hardware error.	Return the unit to the supplier.

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A

USING THE CONSOLE PORT

The Hub 1000 SX is ready to use and requires no configuration. However, on rare occasions you may need to confirm a POST failure, change a port's configuration, or update the firmware image to install a bug fix or a standards update. The console port provides access to a simple scrolling command line interface (CLI). By connecting the console port to a PC, you can perform these tasks:

- Configure port settings
- Display hub status
- Update the firmware image

The console port (a DB-9 standard male connector) is located on the Hub 1000 SX rear panel. See Figure A-1.

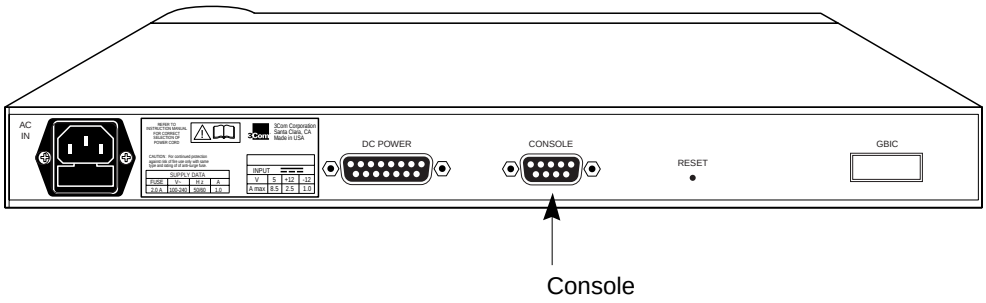

Figure A-1 Console Port

The console port default settings are:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity

Auto-baud and modem connections are not supported.

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Requirements

To use the console port and CLI, you need:

- A PC with a serial port
- A null modem cable
- A terminal-emulation program

  If you need to perform a firmware update, the terminal-emulation program must support one of these file transfer protocols: Xmodem, Xmodem-1K, or Xmodem-CRC.

Connecting the Console Port

It is not necessary to disconnect the hub from the power source to connect the console port. However, if you do disconnect the power, you can watch POST messages when you reconnect the power.

With Power Connected

To connect the console port while the hub is connected to power:

1. Connect a null modem cable between the PC serial port and the console port on the hub's rear panel. (See Figure A-1.)
2. Turn on the PC.
3. Start the terminal-emulation program.
4. Configure the program with the same settings as the Hub 1000 SX console interface port:
   - 9600 baud
   - 8 data bits
   - 1 stop bit
   - No parity
5. Press Enter.

   The PC screen displays the CLI header and the password prompt:

```
**************************************************
*                                                *
*                SuperStack II (tm)              *
*                   Hub 1000 SX                  *
*        Copyright (c)1997 3Com Corporation      *
*                                                *
**************************************************

Enter password ->
```

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With Power Disconnected

To connect the console port when the hub is disconnected from power:

1. Connect a null modem cable between the PC serial port and the console port on the Hub 1000 SX rear panel.
2. Turn on the PC.
3. Start the terminal-emulation program.
4. Configure the program with the same settings as the Hub 1000 SX console interface port:
   - 9600 baud
   - 8 data bits
   - 1 stop bit
   - No parity
5. Reconnect the hub to the power supply.

   The PC screen displays POST messages, followed by the CLI header and the password prompt.

POST Messages

When you connect the hub to power or when you press the Reset button on the hub's rear panel, the PC screen displays messages while POST is proceeding. When POST is finished, the CLI header appears, followed by the password prompt. For example:

```
POST Level 0: PASS

Checking FDS ... valid.
Performing Level 1 Tests ...
Test: Port 0 -  Pass.
Test: Port 1 -  Pass.
Test: Port 2 -  Pass.
Test: Port 3 -  Pass.
Test: Port 4 -  Pass.
Test: Port 5 -  Pass.
Test: Port 6 -  Pass.
Test: Port 7 -  Pass.
Test: Port 8 -  Pass.
Test: Port aliasing -  Pass.
Test: MAC Address - Valid: 08004E2BA4D9
Test: Fan sense -  Pass.

POST Level 1: PASS
```

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```
Hardware Version 0
Bootcode Version  1.00, 02/05/98
Firmware Version  1.00, 02/05/98

**************************************************
*                                                *
*                SuperStack II (tm)              *
*                   Hub 1000 SX                  *
*        Copyright (c)1997 3Com Corporation      *
*                                                *
**************************************************

Enter password ->
```

Any POST FAIL message indicates a fatal hardware error. If you see a FAIL message, return the hub to the supplier.

Logging On

The default password that is set at the factory is *admin*. If this is the first time that anyone has logged on to the hub, enter the default password at the prompt:

admin

Asterisks (*) instead of plain text appear at the prompt while you are typing the password.

The Hub 1000 SX *Configuration* menu appears.

```
 **************************************************
 **           Hub 1000 Configuration Menu        **
 **************************************************
 [1]  Configure port settings
 [2]  Display hub status
 [3]  Update firmware image
 [4]  Change password
 [5]  Logout

Enter choice ->
```

To select an option from the *Configuration* menu, enter the option number at the prompt.

After 4 minutes of inactivity, the CLI logs off automatically.

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Changing the Password

You can change the password if you need to. The new password must be eight characters or fewer and cannot contain spaces or tabs.

To change the password, enter:

4

You are prompted to enter the old password and then the new password, as shown in this example:

```
************************************************
**           Hub 1000 Configuration Menu         **
************************************************
[1]  Configure port settings
[2]  Display hub status
[3]  Update firmware image
[4]  Change password
[5]  Logout

Enter choice -> 4
Old password: *****
New password: *******
Re-enter new password: *******
Password changed.
```

The following sections show examples of how to use the Hub 1000 SX *Configuration* menu.

Configuring Port Settings

Table A-1 summarizes the situations that require you to configure port settings through the *Port Configuration* menu.

Table A-1 Situations That Require Configuring Port Settings

Situation	Action
You do not want a port to be connected.	Disable the port.
A port cannot connect with a linked device.	Disable auto-negotiation. (Force the link.)
A linked device does not support auto-negotiation.	Disable auto-negotiation. (Force the link.)
You are connecting to a server or a 10/100 Mbps switch through the uplink.	Configure the uplink for asymmetric flow control.

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To display the *Port Configuration* menu:

1 At the *Configuration* menu prompt, enter:

1

2 At the next prompt, enter the numbers of the ports that you want to configure.

You can specify a single port number, multiple port numbers separated by commas or spaces (for example: 5, 6 7), or a range of port numbers separated with a hyphen (for example: 5-7).

The following example specifies ports 3, 5, 6, and 7:

```
************************************************
 **           Hub 1000 Configuration Menu         **
 ************************************************
 [1]  Configure port settings
 [2]  Display hub status
 [3]  Update firmware image
 [4]  Change password
 [5]  Logout

Enter choice -> 1

Enter port number(s), from 1 to 9: 3 5-7
```

The *Port Configuration* menu appears, and the specified ports are displayed. For example:

```
 ****      Port Configuration Menu     ****
 (1)  Enable port
 (2)  Disable port
 (3)  Enable Auto-Negotiation
 (4)  Disable Auto-Negotiation (Force link)
 (5)  Show port settings
 (6)  Use factory default settings
 (7)  Save new port settings
 (8)  Exit without change to settings
 (9)  Apply changes and exit

Selected ports: 3, 5, 6, 7
Enter choice ->
```

Table A-2 summarizes the *Port Configuration* menu options.

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Table A-2 *Port Configuration* Menu

Option	Description
(1) Enable port	Enable the port for linking. The factory default is all ports enabled.
(2) Disable port	Disable the port for linking.
(3) Enable auto-negotiation	Enable auto-negotiation. The factory default is auto-negotiation enabled on all ports.
(4) Disable auto-negotiation (force link)	Disable auto-negotiation.
(5) Show port settings	List the current settings for all ports.
(6) Use factory default settings	Return selected ports to factory default settings.
(7) Save new port settings	Save the settings. Select this option if you want settings to persist after a hub reset.
(8) Exit without change to settings	Exit to the Hub 1000 SX *Configuration* menu without applying or saving settings.
(9) Apply changes and exit	Apply the settings and exit to the Hub 1000 SX *Configuration* menu. If you want settings to persist after a hub reset, you must select option 7 before selecting option 9.

Disabling Ports

The following example shows how to disable ports 3, 5, 6, and 7 and apply the changes.

```
 ************************************************
 **           Hub 1000 Configuration Menu      **
 ************************************************
 [1]  Configure port settings
 [2]  Display hub status
 [3]  Update firmware image
 [4]  Change password
 [5]  Logout

Enter choice -> 1

Enter port number(s), from 1 to 9: 3 5-7

 ****      Port Configuration Menu     ****
 (1)  Enable port
 (2)  Disable port
 (3)  Enable Auto-Negotiation
 (4)  Disable Auto-Negotiation (Force link)
```

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```
 (5)  Show port settings
 (6)  Use factory default settings
 (7)  Save new port settings
 (8)  Exit without change to settings
 (9)  Apply changes and exit

Selected ports: 3, 5, 6, 7
Enter choice -> 2

 ****      Port Configuration Menu     ****
 (1)  Enable port
 (2)  Disable port
 (3)  Enable Auto-Negotiation
 (4)  Disable Auto-Negotiation (Force link)
 (5)  Show port settings
 (6)  Use factory default settings
 (7)  Save new port settings
 (8)  Exit without change to settings
 (9)  Apply changes and exit

Selected ports: 3, 5, 6, 7
Enter choice -> 9
Changes applied
```

Any time you select option 9 without selecting option 7, the settings will return to the previous values in the event of a hub reset. This allows you to experiment with port settings without specifying that they persist after a hub reset. If you want settings to persist, select option 7 before selecting option 9.

Disabling Auto-Negotiation

Disabling the auto-negotiation capability enables *forced link* on a port. When forced link is enabled, linked devices must have matching flow control capabilities. For example, a port that is set for forced link and outgoing flow control can connect successfully only with a port that is set for forced link and incoming flow control.

When you disable auto-negotiation on a Hub 1000 SX port, you also need to set forced link on the connected device. On some devices, this setting is called *forced configuration* or *link negotiation*. For details on the correct configuration, see the configuration guidelines for the linked device.

The following example shows how to disable auto-negotiation on port 1, save the new port setting, and apply it.

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```
 ************************************************
 **           Hub 1000 Configuration Menu      **
 ************************************************
 [1]  Configure port settings
 [2]  Display hub status
 [3]  Update firmware image
 [4]  Change password
 [5]  Logout

Enter choice -> 1

Enter port number(s), from 1 to 9: 1

 ****      Port Configuration Menu     ****
 (1)  Enable port
 (2)  Disable port
 (3)  Enable Auto-Negotiation
 (4)  Disable Auto-Negotiation (Force link)
 (5)  Show port settings
 (6)  Use factory default settings
 (7)  Save new port settings
 (8)  Exit without change to settings
 (9)  Apply changes and exit

Selected ports: 1
Enter choice -> 4
Enable Outgoing Flowcontrol (Y/N)? y
```

Port 1 is a downlink. Because downlinks support outgoing flow control only, you can enable or disable outgoing flow control, but you cannot configure incoming flow control. You might choose to disable outgoing flow control if the port is linking to a device that does not support flow control.

```
 ****      Port Configuration Menu     ****
 (1)  Enable port
 (2)  Disable port
 (3)  Enable Auto-Negotiation
 (4)  Disable Auto-Negotiation (Force link)
 (5)  Show port settings
 (6)  Use factory default settings
 (7)  Save new port settings
 (8)  Exit without change to settings
 (9)  Apply changes and exit

Selected ports: 1
Enter choice -> 7
Settings saved
```

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Because option 7 has been selected, the settings will persist after a hub reset.

```
****      Port Configuration Menu     ****
(1)  Enable port
(2)  Disable port
(3)  Enable Auto-Negotiation
(4)  Disable Auto-Negotiation (Force link)
(5)  Show port settings
(6)  Use factory default settings
(7)  Save new port settings
(8)  Exit without change to settings
(9)  Apply changes and exit

Selected ports: 1
Enter choice -> 9
Changes applied
```

Configuring the Uplink for Asymmetric Flow Control

The uplink (port 9) defaults to symmetric (both outgoing and incoming) flow control. You must configure the uplink for asymmetric flow control to connect it to a server or 10/100 Mbps switch. The server or switch must have the appropriate NIC or uplink device, support flow control, and be configured to receive pause frames.

The following example shows how to configure the uplink for asymmetric flow control by disabling auto-negotiation, enabling outgoing flow control, and disabling incoming flow control. With this configuration, the uplink is set to forced link and can send pause frames but ignores pause frames that it receives. (For more details on flow control, see "Flow Control" in Chapter 1.)

```
************************************************
**           Hub 1000 Configuration Menu          **
************************************************
[1]  Configure port settings
[2]  Display hub status
[3]  Update firmware image
[4]  Change password
[5]  Logout

Enter choice -> 1

Enter port number(s), from 1 to 9: 9
```

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```
 ****      Port Configuration Menu     ****
 (1)  Enable port
 (2)  Disable port
 (3)  Enable Auto-Negotiation
 (4)  Disable Auto-Negotiation (Force link)
 (5)  Show port settings
 (6)  Use factory default settings
 (7)  Save new port settings
 (8)  Exit without change to settings
 (9)  Apply changes and exit

Selected ports: 9
Enter choice -> 4
Enable Outgoing Flowcontrol (Y/N)? y
Enable Incoming Flowcontrol (Y/N)? n

****      Port Configuration Menu     ****
 (1)  Enable port
 (2)  Disable port
 (3)  Enable Auto-Negotiation
 (4)  Disable Auto-Negotiation (Force link)
 (5)  Show port settings
 (6)  Use factory default settings
 (7)  Save new port settings
 (8)  Exit without change to settings
 (9)  Apply changes and exit

Selected ports: 9
Enter choice -> 7
Settings saved
```

Because option 7 has been selected, the settings will persist after a hub reset.

```
 ****      Port Configuration Menu     ****
 (1)  Enable port
 (2)  Disable port
 (3)  Enable Auto-Negotiation
 (4)  Disable Auto-Negotiation (Force link)
 (5)  Show port settings
 (6)  Use factory default settings
 (7)  Save new port settings
 (8)  Exit without change to settings
 (9)  Apply changes and exit

Selected ports: 9
Enter choice -> 9
Changes applied
```

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Displaying Hub Status

Hub status includes a matrix of information about the hub ports. In this matrix, *Y* indicates yes and *n* indicates no. (See Table A-3.)

Table A-3 Hub Status Information

Category	State	Description
Port is enabled	Y	The port is enabled for linking.
	n	The port is disabled for linking.
Link state is up	Y	A link exists between the port and a device.
	n	No link exists between the port and a device.
Auto-negotiate link configuration	Y	The port is set for auto-negotiation.
	n	The port is set for forced link.
Advertise outgoing flow control	Y	The port signals outgoing flow control capability.
	n	The port does not signal outgoing flow control capability.
Advertise incoming flow control	Y	The port signals incoming flow control capability.
	n	The port does not signal incoming flow control capability.
	–	The port does not support incoming flow control.
Enable outgoing flow control	Y or n	If auto-negotiation is enabled, the result of the negotiation between the port and the linked device is shown. If auto-negotiation is disabled, the flow control you specify is shown.
Enable incoming flow control	Y or n	If auto-negotiation is enabled, the result of the negotiation between the port and the linked device is shown. If auto-negotiation is disabled, the flow control you specify is shown.
	–	The port does not support incoming flow control.

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Hub status also includes POST and fan status, bandwidth utilization, hardware and firmware version, and MAC address.

The sample hub status display that follows is the result of the changes made in the previous section. To view the hub status, enter:

2

When you have finished viewing the hub status, press Enter to continue the CLI session.

```
*************************************************
**           Hub 1000 Configuration Menu       **
*************************************************
[1]  Configure port settings
[2]  Display hub status
[3]  Update firmware image
[4]  Change password
[5]  Logout

Enter choice -> 2

Hub Status
Port Number:                       1  2  3  4  5  6  7  8  9
===========                        =  =  =  =  =  =  =  =  =
Port is Enabled:                   Y  Y  n  Y  n  n  n  Y  Y
Link state is up:                  Y  Y  n  Y  n  n  n  Y  Y
Auto-Negotiate link configuration: n  Y  Y  Y  Y  Y  Y  Y  n
Advertise outgoing flow control:   Y  Y  Y  Y  Y  Y  Y  Y  Y
Advertise incoming flow control:   -  -  -  -  -  -  -  -  n
Enable outgoing flow control:      Y  Y  Y  Y  Y  Y  Y  Y  Y
Enable incoming flow control:      -  -  -  -  -  -  -  -  n
Port has passed POST:              Y  Y  Y  Y  Y  Y  Y  Y  Y

POST status: PASS
Fan status: Good
Bandwidth utilization: 0%

Hardware Version: 0
Firmware version:  1.00, 02/05/98
MAC Address: 08004E2BA4D9

Press Enter to continue ...
```

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Restoring the Factory Default Settings

To restore port settings to factory defaults:

1. At the *Configuration* menu prompt, enter:

   1

2. Enter the numbers of the ports to be restored to factory defaults.
3. At the *Port Configuration* menu prompt, enter:

   6

4. Apply the changes.

For example:

```
************************************************
**           Hub 1000 Configuration Menu         **
************************************************
[1]  Configure port settings
[2]  Display hub status
[3]  Update firmware image
[4]  Change password
[5]  Logout

Enter choice -> 1

Enter port number(s), from 1 to 9: 1-9

****      Port Configuration Menu     ****
(1)  Enable port
(2)  Disable port
(3)  Enable Auto-Negotiation
(4)  Disable Auto-Negotiation (Force link)
(5)  Show port settings
(6)  Use factory default settings
(7)  Save new port settings
(8)  Exit without change to settings
(9)  Apply changes and exit

Selected ports: 1, 2, 3, 4, 5, 6, 7, 8, 9
Enter choice -> 6
Ports set to factory defaults
```

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```
****      Port Configuration Menu     ****
(1)  Enable port
(2)  Disable port
(3)  Enable Auto-Negotiation
(4)  Disable Auto-Negotiation (Force link)
(5)  Show port settings
(6)  Use factory default settings
(7)  Save new port settings
(8)  Exit without change to settings
(9)  Apply changes and exit

Selected ports: 1, 2, 3, 4, 5, 6, 7, 8, 9
Enter choice -> 9
Changes applied
```

If you want settings to persist after a hub reset, enter option 7 before entering option 9.

Updating the Firmware Image

On rare occasions you may need to update the hub's firmware image to install a bug fix or a standards update. Firmware updates are made available on the 3Com World Wide Web site:

http://www.3com.com/

Checking the Firmware Version

To verify that the firmware version on the 3Com World Wide Web site is more recent than the version installed on the hub, display the hub status. At the Hub 1000 SX *Configuration* menu prompt, enter:

2

```
************************************************
**           Hub 1000 Configuration Menu         **
************************************************
[1]  Configure port settings
[2]  Display hub status
[3]  Update firmware image
[4]  Change password
[5]  Logout

Enter choice -> 2
```

The firmware version is listed near the bottom of the Hub Status screen. For example:

```
Firmware version:  1.00, 02/05/98
```

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Transferring the Firmware Image File

Make sure that the terminal-emulation program supports one of the following file transfer protocols: Xmodem, Xmodem-1K, or Xmodem-CRC.

To transfer the firmware image file:

1. Obtain the file that contains the firmware image from the 3Com World Wide Web site:

   http://www.3com.com/

2. Copy the file to the PC.
3. Connect the console port to the PC. (See "Connecting the Console Port" earlier in this appendix.)
4. Log on. (See "Logging On" earlier in this appendix.)
5. At the Hub 1000 SX *Configuration* menu prompt, enter:

   3

```
************************************************
 **           Hub 1000 Configuration Menu         **
 ************************************************
 [1]  Configure port settings
 [2]  Display hub status
 [3]  Update firmware image
 [4]  Change password
 [5]  Logout

Enter choice -> 3
```

   The hub enters file transfer mode and prompts you to begin the file transfer.

```
Please initiate XMODEM transfer now.  Press <ESC> to abort.
C
```

   The C character indicates that the hub is waiting for the terminal-emulation program to send a file.

   If you want to stop the file transfer at this point, press Esc.

6. From the terminal-emulation program, select the appropriate command to send a file using the Xmodem, Xmodem-1K, or Xmodem-CRC protocol.

   This command varies, depending on the terminal-emulation program. Some programs call this operation *uploading* a file.

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7 When prompted, enter the filename of the firmware image file.

The terminal-emulation program begins to transfer the firmware image file. If you want to stop the file transfer, use the appropriate command in the terminal-emulation program.

After the transfer is finished, the CLI displays the following message:

```
File transfer successful.
Firmware update successful.
```

If the runtime software is corrupted (for example, if power is interrupted during a firmware update), the CLI displays the following message:

```
Runtime image not valid.
```

The CLI prompts you to restart the file transfer, without requiring you to log in again. To restart the file transfer, repeat steps 6 and 7.

Logging Off

To log off the CLI, at the Hub 1000 SX *Configuration* menu prompt, enter:

5

```
************************************************
 **           Hub 1000 Configuration Menu         **
 ************************************************
 [1]  Configure port settings
 [2]  Display hub status
 [3]  Update firmware image
 [4]  Change password
 [5]  Logout

Enter choice -> 5
```

The screen returns to the CLI header and the password prompt.

Troubleshooting

If a firmware update error occurs, the UNIT STATUS LED flashes amber/green. Press the Reset button on the Hub 1000 SX rear panel and repeat the procedure for updating the firmware. If the UNIT STATUS LED continues to flash amber/green, return the unit to the supplier.

Table A-4 summarizes error messages that may appear during a file transfer and actions you can take to correct the errors.

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Table A-5 lists fatal error messages. These messages indicate that the memory unit has failed. If you see a fatal error message, return the unit to the supplier.

Table A-4 File Transfer Error Messages

Message	Meaning	Action
Xmodem error: Timed out sending NAK.	The hub could not send a negative acknowledgment.	For any of these errors, check the following items and then restart the transfer: ■ Make sure that the hub is in file transfer mode (you selected option 3 in the Hub 1000 SX *Configuration* menu). ■ Make sure that you are using the correct protocol in the terminal-emulation program. ■ Verify that you copied the correct file from the 3Com Web site. If necessary, download the file from the Web site again. ■ Check that cables are connected properly. ■ Eliminate any interference that may be coming from lighting or from equipment operating near the hub.
Xmodem error: Timed out sending ACK.	The hub could not send an acknowledgment.	
Xmodem error: Timed out waiting for packet.	The time limit for receiving a packet was exceeded.	
Timed out waiting for transfer to start.	The time limit for starting the file transfer was exceeded.	
Xmodem error: Got too many errors to continue.	The hub error limit was exceeded.	
Xmodem error.	A general protocol error occurred.	
Abort key hit. Transfer aborted.	The user pressed Esc to stop the transfer.	
Transfer aborted by file sender.	The Xmodem operation in the terminal-emulation program stopped the transfer.	
File too large. Transfer aborted.	The file being transferred is too large for the hub's memory.	
Downloaded file not valid.	The firmware image file is corrupted, or its format is incorrect.	

Table A-5 Fatal Error Messages

Message	Context	Action
Flash memory erase error.	During firmware update.	For any of these errors, return the unit to the supplier.
Flash memory programming error.	During firmware update.	
Data storage error.	While saving port settings or changing the password.	
System stopped!	During firmware update.	

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B

SPECIFICATIONS

This appendix lists the specifications for the SuperStack II Hub 1000 SX.

Physical Dimensions

Height:	4.37 cm (1.72 in.)
Width:	43.94 cm (17.3 in.)
Depth:	30.48 cm (12 in.)
Weight:	5.5 kg (12 lb)

Environmental Operating Ranges

Operating temperature:	0˚ to 50 ˚C (32˚ to 122 ˚F)
Storage temperature:	–30˚ to 60 ˚C (–22˚ to 140 ˚F)
Operating humidity:	10% to 90% relative humidity, noncondensing
Storage humidity:	10% to 95% relative humidity, noncondensing
Electrostatic discharge:	Does not exceed 25 kV
Operating altitude:	–300 to 3000 meters (–296 to 9840 ft)

Power Requirements

AC input voltage:	90–264 V; 115–230 V nominal
Input frequency range:	47–63 Hz, single phase AC
Inrush current:	40 A peak maximum at cold start for half cycle at any rated input voltage; no damage to the supply from repeated on/off/on cycles under hot or cold conditions
AC input isolation:	Between primary and secondary circuits: 3000 V
	Between primary circuit and chassis: 1500 V
Power consumption:	65 W maximum
Heat output:	90 BTU/hr
Fuse:	Fast-blow, 250 VAC, 3.15 A, high breaking capacity

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C

TECHNICAL SUPPORT

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the very latest, we recommend that you access 3Com Corporation's World Wide Web site.

Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com Bulletin Board Service (3ComBBS)
- 3ComFacts℠ automated fax service
- 3ComForum on CompuServe online service

World Wide Web Site

Access the latest networking information on 3Com Corporation's World Wide Web site by entering our URL into your Internet browser:

`http://www.3com.com/`

This service features the latest information about 3Com solutions and technologies, customer service and support, news about the company, *Net Age*® Magazine, technical documentation, and more.

3Com Bulletin Board Service

3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

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Access by Analog Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Data Rate	Telephone Number
Australia	up to 14400 bps	61 2 9955 2073
Brazil	up to 14400 bps	55 11 5181 9666
France	up to 14400 bps	33 1 6986 6954
Germany	up to 28800 bps	4989 62732 188
Hong Kong	up to 14400 bps	852 2537 5601
Italy	up to 14400 bps	39 2 27300680
Japan	up to 14400 bps	81 3 3345 7266
Mexico	up to 28800 bps	52 5 520 7835
P.R. of China	up to 14400 bps	86 10 684 92351
Taiwan, R.O.C.	up to 14400 bps	886 2 377 5840
U.K.	up to 28800 bps	44 1442 438278
U.S.A.	up to 28800 bps	1 408 980 8204

Access by Digital Modem

ISDN users can dial in to 3ComBBS using a digital modem for fast access up to 56 Kbps. To access 3ComBBS using ISDN, use the following number:

1 408 654 2703

3ComFacts Automated Fax Service

3Com Corporation's interactive fax service, 3ComFacts, provides data sheets, technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3ComFacts using your Touch-Tone telephone using one of these international access numbers:

Country	Telephone Number
U.K.	44 1442 438279
U.S.A.	1 408 727 7021

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Local access numbers are available within the following countries:

Country	Telephone Number	Country	Telephone Number
Australia	1800 123 853	Netherlands	0800 0228049
Belgium	0800 71279	Norway	800 11062
Denmark	800 17319	Portugal	0505 442 607
Finland	98 001 4444	Russia (Moscow only)	956 0815
France	0800 908158	Spain	900 964 445
Germany	0130 81 80 63	Sweden	020 792954
Italy	1678 99085	U.K.	0800 626403

3ComForum on CompuServe Online Service

3ComForum contains patches, software, drivers, and technical articles about all 3Com products, as well as a messaging section for peer support. To use 3ComForum, you need a CompuServe account.

To use 3ComForum:

1. Log on to your CompuServe account.
2. Type **`go threecom`**
3. Press [Return] to see the 3ComForum main menu.

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

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Support from 3Com

If you are unable to receive support from your network supplier, technical support contracts are available from 3Com.

Contact your local 3Com sales office to find your authorized service provider using one of these numbers:

Regional Sales Office	Telephone Number
3Com Corporation	
P.O. Box 58145 5400 Bayfront Plaza Santa Clara, California 95052-8145 U.S.A.	800 NET 3Com
3Com Asia Limited	
Australia	61 2 9937 5000 (Sydney) 61 3 9866 8022 (Melbourne)
Hong Kong	852 2501 1111
India	91 11 644 3974
Indonesia	62 21 572 2088
Japan	81 6 536 3303 (Osaka) 81 3 3345 7251 (Tokyo)
Korea	82 2 3455 6300
Malaysia	60 3 732 7910
New Zealand	64 9 366 9138
Philippines	632 892 4476
P.R. of China	8610 68492568 (Beijing) 86 21 63501581 (Shanghai)
Singapore	65 538 9368
Taiwan, R.O.C.	886 2 377 5850
Thailand	662 231 8151 5
3Com Austria	43 1 580 17 0
3Com Benelux B.V.	
Belgium	32 2 725 0202
Netherlands	31 0346 586211
3Com Canada	
Calgary	403 265 3266
Edmonton	403 423 3266
Montreal	514 683 3266
Ottawa	613 566 7055
Toronto	416 498 3266
Vancouver	604 434 3266
3Com France	33 1 69 86 68 00
3Com GmbH	
Czech Republic/Slovak Republic	420 2 21845 800

Regional Sales Office	Telephone Number
3Com GmbH (cont'd)	
Germany (Central European HQ)	49 30 34 98790 (Berlin) 49 89 627320 (Munich)
Hungary	36 1 250 83 41
Poland	48 22 6451351
3Com Iberia	
Portugal	351 1 3404505
Spain	34 1 5096900
3Com Latin America	
U.S. Headquarters	408 326 2093
Northern Latin America	305 261 3266 (Miami, Florida)
Argentina	541 312 3266
Brazil	55 11 5181 0869
Chile	562 633 9242
Colombia	57 1 629 4847
Mexico	52 5 520 7841/7847
Peru	51 1 221 5399
Venezuela	58 2 953 8122
3Com Mediterraneo	
Italy	39 2 253011 (Milan) 39 6 5279941 (Rome)
3Com Middle East	971 4 349049
3Com Nordic AB	
Denmark	45 39 27 85 00
Finland	358 0 435 420 67
Norway	47 22 58 47 00
Sweden	46 8 632 56 00
3Com Russia	007 095 258 09 40
3Com Southern Africa	27 11 807 4397
3Com Switzerland	41 31 996 14 14
3Com Technologies	
Ireland	353 1 820 7077
3Com U.K. Ltd.	44 131 240 2900 (Edinburgh) 44 161 873 7717 (Manchester) 44 1628 897000 (Marlow)

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Returning Products for Repair

Before you send a product directly to 3Com for repair, you must first obtain a Return Materials Authorization (RMA) number. Products sent to 3Com without RMA numbers will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
U.S.A. and Canada	1 800 876 3266, option 2	408 764 7120
Latin America	1 408 326 2927	408 764 7120
Europe, South Africa, and Middle East	44 1442 435860	44 1442 435822
Elsewhere	1 408 326 2926	1 408 764 7120

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GLOSSARY

10BASE-T The IEEE 802.3 physical layer specification for a 10 Mbps Ethernet network over two pairs of Category 3, 4, or 5 UTP wire.

100BASE-T The group of IEEE 802.3 physical layer specifications for a 100 Mbps Ethernet network over various wiring specifications.

1000BASE-X The group of IEEE 802.3 physical layer specifications for a 1000 Mbps Ethernet network over various wiring specifications.

1000BASE-CX The IEEE 802.3 physical layer specification for a 1000 Mbps Ethernet network over short-haul shielded balanced copper cable (known as twinaxial STP).

1000BASE-LX The IEEE 802.3 physical layer specification for a 1000 Mbps Ethernet network over long laser wavelength (1300 nm) multimode fiber (MMF) or single-mode fiber (SMF) cable.

1000BASE-SX The IEEE 802.3 physical layer specification for a 1000 Mbps Ethernet network over short laser wavelength (850 nm) MMF or SMF cable.

Advanced RPS 3Com SuperStack II Advanced Redundant Power System.

asymmetric flow control A relationship between linked network devices in which only one of the devices can receive pause frames. *See also* flow control, pause frame, symmetric flow control.

auto-negotiation A method by which linked devices advertise their signaling capabilities (such as protocol, speed, media type, and flow control capabilities) and automatically select their best common mode of communication.

backbone The main transmission medium used to interconnect the workgroup areas of a network. Fiber-optic cable is often used for the backbone connection.

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bidirectional flow control *See* symmetric flow control.

CSMA/CD Carrier Sense Multiple Access/Collision Detection. Channel access method used by Ethernet and IEEE 802.3 in which devices transmit only after finding the data channel clear for some period. When two devices transmit simultaneously, a collision occurs and the colliding devices delay their retransmissions for a random length of time.

Ethernet A local area network standard defining a physical medium and its method of placing data, or packet signaling, on a cable. Access to the cable is based on CSMA/CD (Carrier Sense Multiple Access/Collision Detection).

Fast Ethernet A 100 Mbps technology based on the Ethernet CSMA/CD network access method.

fiber-optic cable Cable consisting of a glass center, cladding, a buffer layer, strength members, and a cable sheath. The glass center supports the transmission of light signals.

flow control A method for ensuring that a transmitting entity does not overwhelm a receiving entity with data. *See also* asymmetric flow control, incoming flow control, outgoing flow control, pause frame, symmetric flow control.

forced link A method by which devices link with fixed and matching signaling capabilities. *See also* auto-negotiation.

full-duplex The ability of a device or line to transmit data simultaneously in both directions. *See also* half-duplex.

Gigabit Ethernet A 1000 Mbps network technology that retains support for 10/100 Mbps Ethernet CSMA/CD networks.

half-duplex Data transmission that can occur in two directions over a single line, but in only one direction at a time. *See also* full-duplex.

hub A device used to provide connectivity between network devices. Hubs perform the basic repeater functions of restoring signal amplitude and timing, detecting collisions, and broadcasting signals to network devices. *See also* repeater.

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IEEE Institute of Electrical and Electronics Engineers. Committees that develop and propose computer standards, such as the 802 protocols, which define the physical and data link protocols of communication networks. Members represent an international cross section of users, vendors, and engineering professionals.

incoming flow control The ability of a device to receive pause frames. *See* symmetric flow control.

LAN Local area network. An assembly of computing resources such as PCs, printers, minicomputers, and mainframe computers linked by a common transmission medium, such as UTP.

LED Light-emitting diode. A diode that converts voltage to light and that is commonly used in digital displays.

MAC Media Access Control. The data link sublayer that is responsible for transferring data to and from the physical layer.

Mbps Megabits per second.

outgoing flow control The ability of a device to send pause frames. *See* Asymmetric flow control.

partition A repeater function that isolates a particular port from the network because of an excessive number of collisions. Once the problem causing the collisions is corrected, the port is reactivated.

pause frame A set of bits that tells a transmitting device to stop the transmission of data frames for a specified period or to resume the transmission of data frames.

power workgroup A small number of servers or a small number of sophisticated users on high-end workstations. A power workgroup requires very high performance to run applications that move and process massive amounts of data in real time (for example, medical imaging, video editing, film postproduction, CAD/CAM, or digital prepress).

repeater A device that extends the length, topology, or interconnectivity of the physical medium beyond that imposed by a single segment, up to the maximum allowable end-to-end trunk transmission line length. Repeaters perform the basic actions of restoring signal amplitude, waveform, and timing applied to normal data and collision signals. *See also* hub.

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SC A fiber-optic cable connector. When it is pushed into place, the connector is seated automatically.

STP Shielded twisted-pair. Shielded four-conductor electrical cable that offers high-speed transmission for long distances.

SuperStack 3Com system of stackable hubs, servers, switches, routers, SDLC converters, and power supplies. SuperStack systems can support a range of LAN environments, including Ethernet, token ring, FDDI, SNA, and ATM.

symmetric flow control A relationship between linked network devices in which both devices can send and receive pause frames. Also called *bidirectional flow control*. *See also* asymmetric flow control, flow control, pause frame.

twisted-pair Wiring similar to that found in the telephone system, consisting of two insulated wires loosely twisted around each other to help cancel out induced noise in balanced circuits.

UTP Unshielded twisted-pair. A cable consisting of two or more pairs of twisted copper wires that are not shielded.

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+5 Limited Warranty

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